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ORGANIZATIONAL STRUCTURE:
IMPLICATIONS FOR MANAGERIAL ACCOUNTING**

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**College of Commerce and Business Administration
University of Illinois at Urbana-Champaign**

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Contingency Formulations of Organizational Structure:
Implications for Managerial Accounting

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In the companion paper to this one, Sathe (1974) clearly points out, that advent of contingency theories of organization structure, and the research these theories have stimulated, are very recent phenomena. Consequently, their impact to date on the field of accounting, a different discipline, is minimal. This, of course, is not meant to imply that the impact will not be substantial. Just as managerial accounting has been greatly influenced by the traditional theories of organization so too this latest revolution in organizational theory is sure to have its impact. However, at the moment, because of the paucity of research connected with this emerging trend, the content of this paper is largely speculative.

AN ORIENTATION

If the introduction is correct, where is the research? After all, most academic accountants are fully aware of the recent growth in behavioral accounting research. A goodly amount of this has been concerned with such topics as decision making, motivation, perception, budgeting etc., all behavioral questions having some connection with organizations. Isn't some of this relevant?

A perspective on this can be gained by viewing accounting research from a framework borrowed from Emery and Trist (1963). Consider the following matrix:

L ₁₁	L ₁₂
L ₂₁	L ₂₂

where L indicates some potentially lawful connection, the subscript 1

refers to the accounting system and the subscript 2 refers to the organization. Then L_{11} refers to processes within the accounting system - the area of internal interdependencies; L_{12} and L_{21} to exchanges between the accounting system and the organization - the area of transactional interdependencies; and L_{22} to the processes through which parts of the organization become related to one another - that is, its causal texture - the area of interdependencies that belong within the organization itself.

Nearly all technical accounting studies fall within L_{11} , while if the research is behaviorally oriented it will generally fall into L_{12} . For example, in L_{11} we find articles related to changing accounting systems so that they perform better technically or so that they provide new information, e.g., Wolk and Hillman (1972), as well as most mathematical expositions on the accounting function or system, e.g., Cushing (1973). In L_{12} we find the type of research that uses accounting data as the independent variable and observes the effect on some behavioral (dependent) variable, e.g., Dermer and Seigel (1974), Ronen and Falk (1973), Mock (1973), and Dickhaut (1973). This represents the popular kind of behavioral accounting research and nearly all such studies adopt an individual psychology orientation, although it is conceivable that other behavioral levels, e.g., a sociological or social psychological orientation, could provide the dependent variables.

The major implications for accounting of the contingency or structural theories lie in cell L_{21} , where the transactional interdependencies flow from the organization to the accounting system. About the only published article that develops in reasonable detail the proposition that accountability is a function of organization theory is by Golembiewski (1964). He reviews the impact of traditional organization theory and briefly introduces some ideas that were emerging at the time of his writing. The

major portion of this paper will also fall in cell L_{21} . In contrast, L_{22} represents the area in which Sathe's (1974) paper is located.

The perspective adopted in this paper is one of the accounting system as one system (dimension) in a multisystem (multidimensional) system. This viewpoint lends itself to, what could be described as, a partial equilibrium analysis. It is with this perspective that we can think of a contingency theory of managerial accounting, for it seems obvious that the accounting system can vary just as easily as any other organizational dimension.⁽¹⁾ The question then becomes, under what organizational conditions is a particular accounting system appropriate?

We will use as a springboard the technology structure and environment structure perspectives developed by Sathe, in particular, as he enumerated the theoretical concepts of Lawrence and Lorsch (1967) and Thompson (1967). These writers provide us with a contingency framework for viewing basic organizational structure. Some further aspects of this framework will be developed, and then these will be used to examine the role as operating mechanisms of certain managerial accounting subsystems or problems (the measurement and evaluation of organizational performance, responsibility centers, transfer pricing, and aggregation) and how these mechanisms should respond to differing basic organizational structures.

SOME FUNDAMENTAL CONCEPTS

For the moment we will abstract from the complexities of the Sathe paper and concentrate on what seems to be the key concepts that come out

(1) It's obvious that the accounting system is multidimensional itself. For convenience we will consistently employ the undimensional terminology, even though the concept is multidimensional.

of the contingency theories of organization. The relevant concepts come mainly from Lawrence and Lorsch (1967), Thompson (1967) and Lorsch (1972).

1. Environment. The environment is those factors external to the organization that impinge on organizational decision making. The environment is partitioned on two dimensions - a simple-complex dimension and a stable shifting dimension - which gives the following representation. The environment is most difficult to deal

Insert Figure 1 about here

with in quadrant IV and least difficult to deal with in quadrant I.

2. Differentiation. The differences in formal structure among departments and the differences in cognitive and emotional orientations among managers in different departments that arise because of different environmental demands.
3. Integration. The quality of the state of collaboration that exists among departments that are required to achieve unity of effort. The problems of integration revolve around key organizational interdependencies which seem to arise from two sources, namely,
 - (i) the dominant competitive issues facing the organization - an environmental determinant, and
 - (ii) the patterns of task interdependence - a technological determinant.

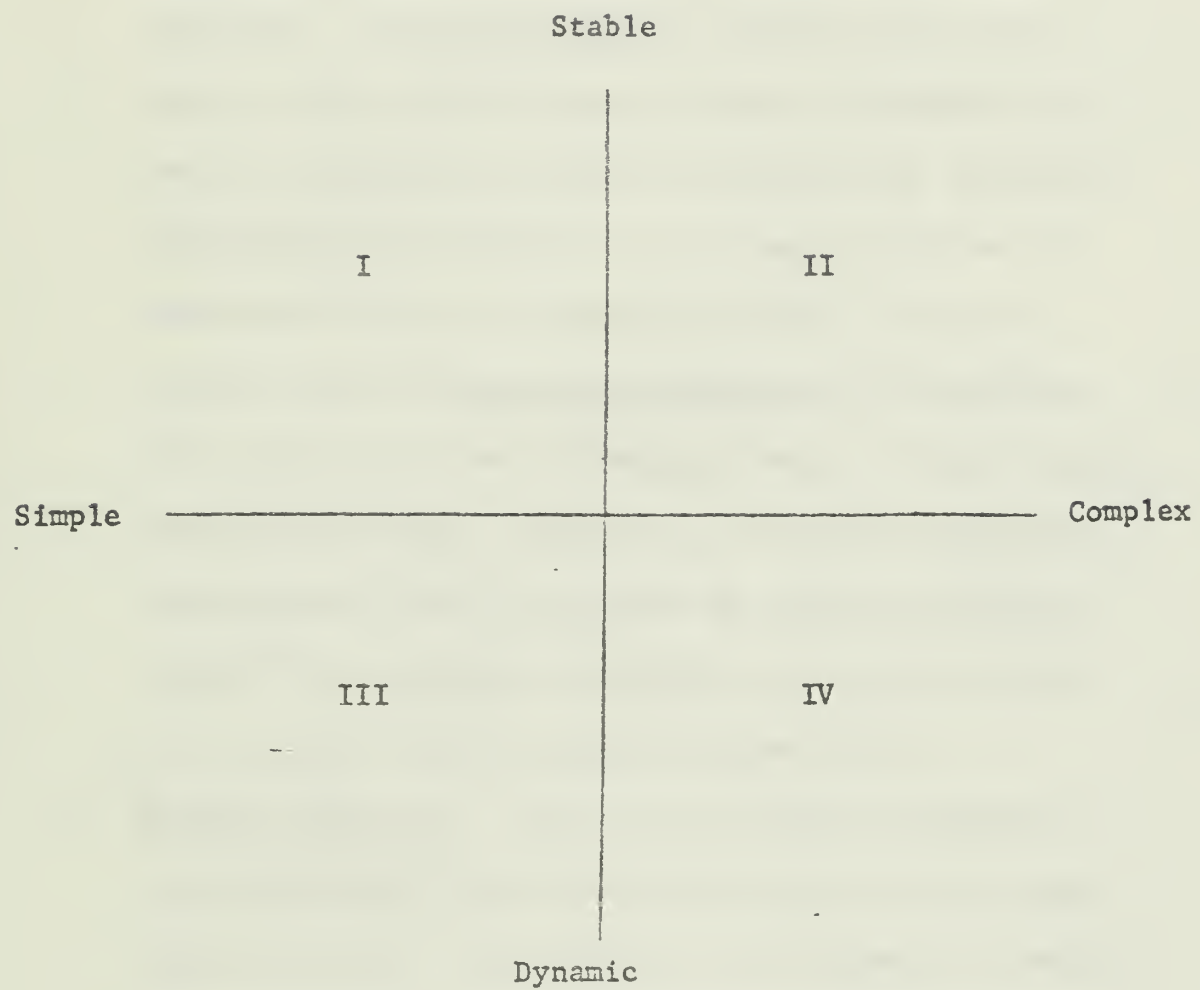


FIGURE I : Partitioning of the Environment

4. Basic Structure and Operating Mechanisms. It is useful to follow Lorsch (1972) and make a distinction between the basic organizational structure and the operating mechanisms which implement and reinforce this basic structure. The basic structure involves the central issues of how the organization should be segmented and how the organization should be integrated to accomplish organizational objectives. The research reported by Sathe concentrates on questions of basic structure. On the other hand operating mechanisms help reinforce the intent of the basic structural design. They include, among other things, such factors as control procedures, information systems and reward and appraisal systems - the stuff of managerial accounting. They are crucial to the proper functioning of an organization.
5. Boundary Proximity. This is the relative placement of an organizational subsystem with respect to the organization boundary. This concept is envisioned, by McNaul, Sathe and Shapiro (1974) as having three dimensions: closeness (temporal and/or Spatial), intensity and frequency. In this paper we will be concerned mainly with the dimension of closeness.

DESIGNING THE BASIC STRUCTURE

Designing the basic structure involves balancing at least two antagonistic states - differentiation and integration. Differentiation increases as we move from a certain environment to an uncertain environment (from quadrant I to quadrant IV in Figure I). So too does the required integration. Required integration is partly a response to

environmental demands but also partly a response to technological demands or task interdependencies. Thompson (1967) identifies three concepts of task interdependence. These are, on a scale of increasing complexity, pooled, sequential and reciprocal interdependence. Watson and Baumler (1973) have suggested the interaction of the environmental and inter-dependency scales allow situations to be identified which can be ranked according to their degree of difficulty of integration. The situations and the implied partial ordering are illustrated below.

Insert Table 1 and Figure 2 about here

Integration is concerned with coordination of activities. The first step is the logical grouping of activities into units. The concepts of differentiation and integration suggest that activities with similar orientations and tasks (low differentiation) should first be grouped together. Second, units which are required to integrate their activities closely should be grouped together (high integration). If these two criteria do not conflict, the basic design problems are not difficult. However if these two criteria do conflict, and this is increasingly the case as we move from A to F in the above partial ordering, one criterion will be optimized at the expense of the other. This will have implications for the use of other structural integrating devices and for the design of operating mechanisms.

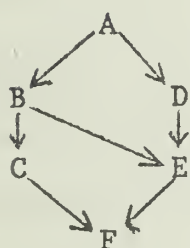
MEASUREMENT AND EVALUATION OF ORGANIZATIONAL PERFORMANCE

Introduction

Information generated by the accounting system is ultimately used for judging performance or behavior, whether it is the total organization, or subunits or individuals within the organization. Of course, the type of information generated by the accounting system is, presently, strictly financial. Since the accounting system tends to be the dominant formal

Environmental Uncertainty Organizational Interdependence	Certain	Uncertain
Pooled	A	D
Sequential	B	E
Reciprocal	C	F

Table 1: Interaction of Environmental and Interdependency Scales




Least difficult

 Most difficult

Figure 2: Partial Ordering

information system in an organization, and therefore a dominant operating mechanism, two questions need to be continually asked. These are:

1. Is the appropriate financial data being reported?
2. Is financial data appropriate?

Contingency theorists (e.g., Thompson, 1967, Chapter 7) argue that the assessment of organizational subunits (and the organization) should be situation specific, the appropriate means of assessment depending upon the type of interdependency existing between the subunits and on the task environment faced by the firm. For example in cell A in the Watson and Baumler formulation the environment is fairly certain and the interdependency is of the relatively simple pooled form. Coordination can be achieved by standardization - the establishment of rules and procedures to maintain consistent action by the subunits affected. Performance can be judged on the basis of how closely the units obey the standards. When we move from cell A to cell B an added mechanism for coordination, coordination by planning, is called for. This also adds a measure of performance - how well subunits meet the plan. In both of the above examples we can see obvious relationships to accounting - for example, standard costs and budgeting. In cell C the coordination is a little more complicated - one of mutual adjustment - and so is the appropriate evaluation of organizational performance. Whereas in the first two cells the question "what is the appropriate financial data?" could be asked, in cell C one can legitimately question whether financial data is appropriate. To answer this question, we need to enrich the framework by explicitly including expectations regarding outcomes and appropriate performance levels..

Cause - Effect and Levels of Performance

Most behavior in organizations and, more generally, most actions and decisions are guided by some model of cause and effect. We take an action, or cause and action to be taken, because we anticipate some consequence

will occur. However, our knowledge of the cause-effect relationship is rarely perfect. The typical situation can be explained as: we take some action based on some anticipated chain of events (cause-effect), but some other set of events occurs simultaneously which results in some unanticipated consequences. The process can be depicted as in Figure 3.

Insert Figure 3 about here

We can assume that when we implement a solution we expect the feedback to be positive, i.e., we expect the consequences of the solution implementation to eliminate or at least relieve the problem. However we have no such assurance with respect to the unanticipated consequences. Since we have no model for that aspect of our solution implementation, we have no way of knowing whether these unanticipated consequences will relieve our problem or intensify it. The feedback may be positive or negative.

This is one example of error in the predicted cause-effect relationship. In this case what we expect to happen happens, but is confounded by a set of events we did not expect to happen. We could also have the case where the anticipated consequences did not happen or where they are greatly modified in form. Thus, in our decision making and organizational behavior in general, we have some beliefs about our cause-effect knowledge in a given situation. Usually, these beliefs fall on a continuum from complete knowledge (usually termed certainty in decision making) to non-knowledge (uncertainty). Organizations tend to operate in a range of incomplete knowledge or make assumptions or use other techniques to convert non-knowledge to some state of incomplete knowledge.

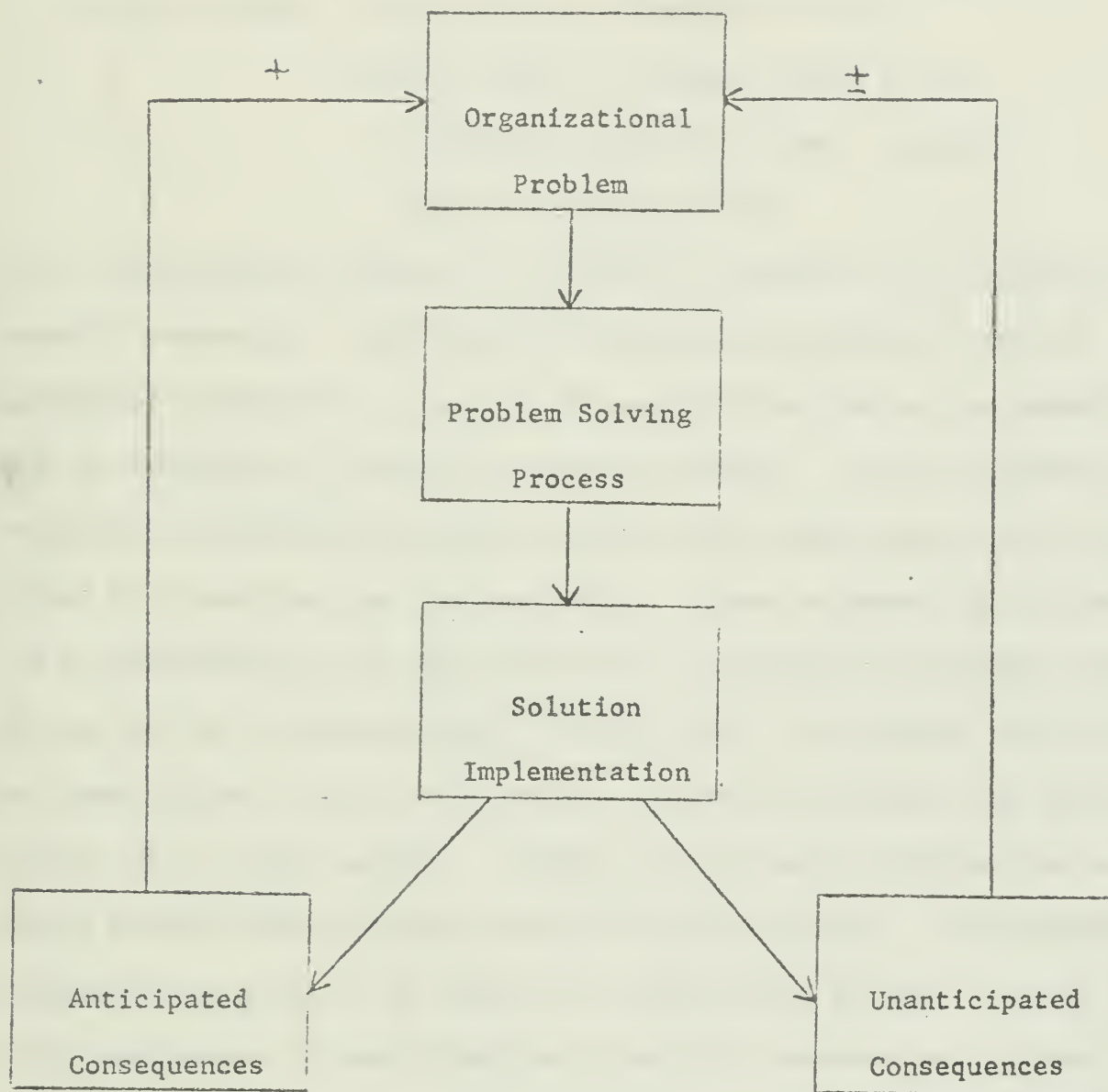


Figure 3: Decision Making and Feedback Process

Students of managerial accounting will be familiar with the following equation (or some variation of this):

$$\begin{aligned}\text{Total Variance} &= \text{Price Variance} + \text{Quantity Variance} \\ &= (\text{Actual Price} - \text{Standard Price}) \text{ Actual} \\ &\quad \text{Quantity} + (\text{Actual Quantity} - \text{Standard} \\ &\quad \text{Quantity}) \text{ Standard Price}\end{aligned}$$

For us the important element is the idea of standards (i.e., price and quantity standards). Although these concepts are generally used by managerial accountants as part of the control function we can generalize this to behavioral or decision actions in general. We use standards of desirability (decision criteria) to assess the effect parts, of the cause-effect relationships, we are considering. These standards of desirability can be undimensional, in that one state is preferred over another state, or they may be multidimensional. In the above, for example, we may prefer low input prices to high input prices. We may also prefer high input quality to low input quality. However, we may have a problem when we must decide between higher prices leading to higher quality. How different dimensions are going to be weighed is a perplexing problem. On top of this, preferences on some dimensions, and their measurement on these dimensions, are clear but on other dimensions are quite vague. Thompson (1967) has suggested that these standards of desirability can vary from crystalized to ambiguous. They can be specific and applicable to a particular situation, or they may be vague and general.

These two dimensions, cause-affect relationships and standards of desirability, may be related in terms of a simple paradigm (Thompson, 1967).

Insert Table 2 about here

Cause - Effect Relationships

		Certain	Uncertain
Standards of Desirability	Crystallized	I	II
	Ambiguous	III	IV

Table 2: Decision Making Framework

Implications of the Cause-Effect - Standards Paradigm and the Differentiation-Integration Paradigm

In cell I (of table 2) we would expect decision making to maximize. We believe we know what actions will have what results and we know what results are wanted. Generally, accounting data is not a suitable basis for making maximizing decisions nor, in general, does accounting data provide the basis for constructing efficiency tests of organizational performance. At times, by making the appropriate assumptions and developing extra data, tests which are inherently efficiency tests are applied. For example, in capital budgeting, extensive reliance is placed on present value analysis and in inventory planning sophisticated inventory models have been developed. It is also true that as the cause-effect relationships become more certain effectiveness tests take on the character of efficiency tests. But most accounting measures are primarily useful for decisions that fall into cell II.

In cell II we are faced with the problem of knowing what is required but not knowing precisely what actions will achieve these results. Satisficing behavior replaces maximizing behavior and the tests of organizational performance are effectiveness or instrumental tests. The traditional accounting model ($\text{Assets} - \text{Liabilities} = \text{Owner Equity}$) provides data particularly useful for judging effectiveness. Measures such as standard costs and variances and accounting rate of return are useful for answering questions of the following kind: "Did we or did we not operate at the cost level we expected?"; or, "Was the accounting rate of return satisfactory, i.e., was it equal to or greater than we expected?". Techniques like standard costs, variances, accounting rate of return, and efficiency and effectiveness tests in general, are basically internal measures of performance. They are most appropriate measures of performance where results cannot be influenced (or this influence is minimized) by parties external to the subunit. In other words, they are particularly useful where organizational integration requirements are low.

Where standards of desirability are ambiguous the paradigm suggests we use other guidelines in our decision making. Unfortunately, well developed alternative measures do not exist. Consequently, we often find instrumental tests being relied upon. In many respects this is understandable for it's hard to imagine an organization or an organizational subunit where some kind of instrumental test cannot be used. For example, even in social work agencies or advertising departments there is always the instrumental test, "Did the agency or department operate within its budget (or some other revenue or cost constraint)?" Thompson (1967), however, suggests that in these cases of ambiguous standards, social reference groups provide an improved basis for evaluating performance. This raises the problem of defining the appropriate reference group.

It seems the fundamentals of the differentiation - integration paradigm can help solve the problem for an organization. In an organization the answer to the question, "What makes cause-effect relationships uncertain and standards of desirability ambiguous?", must include statements about the degree of environmental uncertainty and patterns of task interdependence. These factors may not be the only factors but, intuitively, it appears they must be very influential. The implication of this, is that the factors which increase the difficulty of integrating an organization also affect decision making, in particular, they tend to move the decision environment from cell I towards cell IV in Figure 1. This provides a framework to identify appropriate reference groups and, concomitantly, classes of performance evaluation variables.

In contrast to the "internal measures" of cells I and II, measures particularly useful where integration requirements are greatest, i.e., "external measures" of subunit performance, can now be entertained. Two classes of measures seem appropriate and they are, conveniently, the two dimensions of the integration paradigm of Watson and Baumler. One class

is "the interdependency variables" and the other is "the environmental variables". By interdependency measures is meant dimensions such as confidence, prestige or respect, that reflect the quality of integration among the subunits. Other quantitative dimensions may include the fulfilling of obligations or meeting of plans by the subunits. By environmental measures is meant dimensions which reflect how well the subunit copes with environmental demands. Data on some of these dimensions will only be found in the environment.

The above discussion leads to the following statements regarding the role these various measures should play in the evaluation of subunit performance.

Internal Measures: The importance of these measures should vary inversely with the aggregate importance of interdependency and environmental measures. To reiterate, these will be most important when the requirement for integration of subunits is low.

Interdependency Measures: The importance of these measures varies directly with the complexity of the patterns of task interdependence. That is, in moving from pooled to sequential to reciprocal interdependence among subunits these measures increase in importance.

Environmental Measures: The importance of these measures varies directly with the environmental uncertainty confronting the subunit and the subunit's boundary proximity.

The above statements suggest alternative weights should be placed on
(2)
the measures depending upon organizational contingencies. This can be
illustrated through the Watson and Baumler integration paradigm. To
simplify the example the variable, boundary proximity, is held constant.
(In actual fact, the importance of the environmental measure would be
modified as the subunit became embedded in the organization.)

Insert Table 3 about here

Summary:

The measurement and evaluation of organizational performance is one
of the important contributions by accounting to organizational rationality
Accountants have, in the past, tended to concentrate solely on financial
aspects of the measurement process. There is evidence of increasing
interest in non-financial measures of performance by the accounting profes-
sion. This latest revolution in organization theory provides a rationale
for accelerating the emphasis.

(2) Some research is presently being conducted by David Hayes along lines
similar to those suggested here (see Hayes, 1973). Hayes argues for
a linear aggregation of the three measures to obtain an overall
performance measure. The argument in this paper suggests, rather, a
distributive form of aggregation if a composite performance measure
is desired.

<u>Integration Cell</u>	<u>Available Performance Measures</u>		
	<u>Internal</u>	<u>Interdependency</u>	<u>Environmental</u>
A	1	3	3
B	1	1	3
C	2	1	3
D	1	3	2
E	3	2	1
F	3	1	1

1 implies major importance
 2 implies moderate importance
 3 implies minor importance

Table 3: Suggested Importance of Available Performance Measures as a
Function of the Degree of Difficulty in Integration.

RESPONSIBILITY CENTERS

Cost, profit, and investment centers are operating mechanisms which are used to enhance structural differentiation. Responsibility centers enhance structural differentiation by reinforcing cognitive differences, especially goal and time orientations. If responsibility centers are based upon structurally differentiated units and, reporting, and reward and performance systems are tied to these centers, individual behavior will reflect the particular responsibility concept employed. For example, cost centers will undoubtedly lead to performance and reward systems, and consequently to personal orientations and behavior, based upon meeting or beating short run cost standards. This kind of orientation will differ from the orientations developed when performance and reward systems reflect results reported from the operations of investment centers. Even, say, investment centers designed around different functions or investments may reinforce the development of different goal orientations.

The crucial point here is that the responsibility centers should reflect the environmentally demanded differentiation. Accountants should not try to impose differentiation through the creation of artificial responsibility centers. This is rarely mentioned in the accounting literature which leads to the impression, and a position that some authors seem to advocate (e.g. Goldschmidt, 1970), that responsibility centers can be established successfully anywhere in an organization. This may have dysfunctional behavioral consequences. For example, such inappropriate operating mechanisms may encourage the development of different orientations among organizational members when similar orientations are demanded.

Responsibility centers serve also as a basis on which an accounting system can be established to encourage integration. These centers represent fundamental units of a responsibility accounting system. This is simply a reporting system in which reports build on one another, one layer of reports forming the basis of another layer of reports. This hierarchical reporting system normally reflects the formal management hierarchy and thereby facilitates controlling and coordinating activities through this hierarchy. We will return to this aspect of responsibility accounting and responsibility centers when we broach the topic of aggregation.

TRANSFER PRICING

Interaction among differentiated units may very well involve the transfer of goods and services. If these units also represent responsibility centers this transfer will undoubtedly require the pricing of these goods and services. To begin with, this process helps separate and pinpoint responsibility for different aspects of the organization's functioning, i.e. it enhances differentiation. However, just as important, if not more important, is the function transfer pricing performs in integration. From this point of view we can consider the transfer pricing system as one of the operating mechanisms that reinforces the integrating mechanisms of the basic structure. The logical implication for transfer pricing from contingency theories is that the particular transfer pricing mechanism chosen should reflect the environmental uncertainties and task interdependencies. This implication is examined thoroughly in the paper by Watson and Baumler (1973). Their argument is summarized here by considering their two dimensional integration paradigm and the coordination mechanisms (from Thompson, 1967) that were introduced earlier in the section on performance measurement and evaluation.

Watson and Baumler argued that in moving from cell A towards cell F in their representation the difficulty of integration increased. Consequently, the transfer pricing mechanism should, and could, reflect this increase in integration difficulty. In the simplest cases (e.g. cell A) coordination through rules and standardized procedures is appropriate. Therefore transfer price formulae reflecting standardized procedures, such as fixed prices, cost plus or market price, seem appropriate. Where the integration problem demands coordination through processes such as planning (e.g. cell B) standard variable costs or marginal costs are very appropriate as these mechanisms give the greatest flexibility to units further along in the sequential process. Similarly most mathematical programming solutions to the transfer pricing or resource allocation problem are applicable in this case.

Finally the most complicated integrating situations require coordination by mutual adjustment. Galbraith (1974) develops in detail the kinds of integrating mechanisms that are of this type. Watson and Baumler suggest, that when the integration required is achieved by mutual adjustment, the appropriate transfer pricing mechanism is one of negotiated prices. What kind of useful pricing information the accounting system can provide in these cases is unclear. The information will probably be multiple cost or price choices or suggested bounds on the final negotiated price. At the moment, however, research on this issue is non-existent.

AGGREGATION

A most interesting accounting analogy comes from the concept of integration. Integration is concerned with the quality of coordination.

For an accounting system, an equivalent concept appears to be the quality of aggregation. Once the accounting system is collecting information through basic cost, profit and investment centers, how should this information be aggregated? The traditional answer lies in the management hierarchy. For example, if a sales unit is segmented into a number of product lines, each one a profit center, these profit centers will probably be aggregated so as to form a single sales unit picture. This is the usual responsibility accounting presentation found in managerial accounting texts. Is this aggregation always appropriate?

The contingency theories suggest that the major integration problems (or key organizational interdependencies) arise from the dominant competitive issues and the patterns of task interdependence. These key organizational interdependencies are, analogously, the dominant competitive issues for the accounting system. The aggregation problem is to combine raw input data so that the appropriate financial data is compiled and transmitted to where the organizational interdependencies exist. The patterns of task interdependence for the accounting system arise because of the three functions the accounting system performs. These were identified by Simon et. al. (1954) as:

1. the scorecard function: The accumulation of data.

This allows both internal and external parties to evaluate organizational performance.

2. the attention directing function: This aspect of accounting is commonly associated with current planning and control and with the analysis and investigation recurring, routine internal accounting reports.

3. the problem solving function: This aspect of accounting is commonly associated with non-recurring decision situations that require special accounting analysis or reports.

The major task interdependency is between the first and second functions above. These are the functions that dominate day to day accounting and it is here that the major task integration will occur. The typical mechanisms used for obtaining this integration are budgets and standard costs. Actual scorecard data is compiled and matched against predetermined budget and cost data. Significant differences (variances) represent the attention directing mechanism. Combining these mechanisms with a responsibility accounting system which reflects the key organizational interdependencies is the accounting integration or aggregation problem.

CONCLUSION

Managerial accounting today is still largely dependent upon the organizational theory developments of the 1950's and previous decades. Yet it is becoming apparent that organization theory is rapidly changing. Significant new insights have been made with regard to organizational behavior. The task facing behavioral accountants, interested in managerial accounting and organizational behavior, is to integrate these new insights to enrich the area of managerial accounting and, eventually, developing a theory of the subject. This paper presented a few of the topics which will receive attention in the coming years.

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